

TSTI2D PROJECT – WHIRLWIND BRUSH



I – PRESENTATION:

GOAL: Participate to a speed race of whirlwind brushes.

These brushes can move thanks to vibrations made by an eccentric load fixed on an electric motor shaft.

Whirlwind brushes will be made thanks to kits.

Each kit includes 3 parts:

- A wood-round brush
- A DC electric motor
- A battery with its support



Kit for each team



Whirlwind brush fixed with glue

The manufacturer proposes a glued assembly solution. But the system is not balanced and falls during the race.

You must solve the problem thanks to adjusting devices. The new solutions can avoid the tilt of the brush by moving the position of the center of gravity.

<p>Student 1: make link #1.</p> <p>Link the motor to the brush totally thanks to an intermediary component named « motor support ».</p> <p>This link allows the adjustment between the motor and the brush.</p>	<p>“Motor support” : intermediary component between the motor and the brush allowing the adjustment of the position of the motor on the brush, and the complete link between these 2 parts.</p>		
<p>Student 2: make link #2.</p> <p>Link the battery support to the brush totally thanks to an intermediary component named « battery box support ».</p> <p>This link allows the adjustment between the battery box and the brush.</p>	<p>“Battery box support”: intermediary component between the battery box and the brush allowing the adjustment of the position of the battery box on the brush, and the complete link between these 2 parts.</p>		
<p>Student 3: make link #3.</p> <p>Link the switch to the brush totally thanks to an intermediary component named « switch support ».</p> <p>The grip of the brush will be possible thanks to this support.</p> <p>The logo of the team will be engraved on this support.</p>	<p>“switch support”: intermediary component between the switch and the brush allowing the grip of the brush and its customization.</p>		

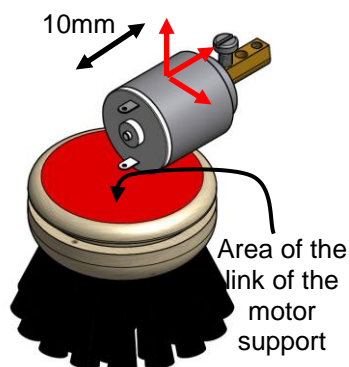
II – SPECIFICATIONS:

About all the links to design

Thickness of the parts: 3mm mini (parts made with a 3D printer)

No modifications of the parts of the provided kit (just the brush is adaptable to make holes for fixing screws).

LINK N°1 between the motor and the brush thanks to the “MOTOR SUPPORT”



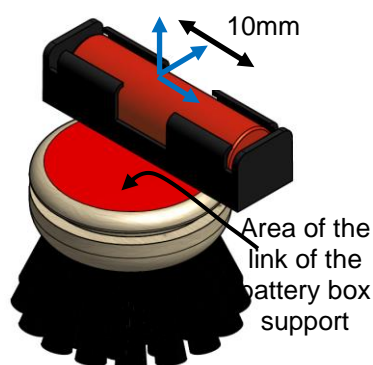
The motor support is totally linked (without adjustments) with the brush.
The motor support is adjustable with the motor.

Adjustable range of the motor: 10mm mini

The motor support is fixed on the upper side of the brush thanks to 2 provided wood screws. These screws are not used for adjustments.

The motor support is fixed on the motor thanks to 2 provided bolts (M2 or M3). These bolts are used for adjustments.
Pressure screws are forbidden.

LINK N°2 between the battery box and the brush thanks to the “BATTERY BOX SUPPORT”



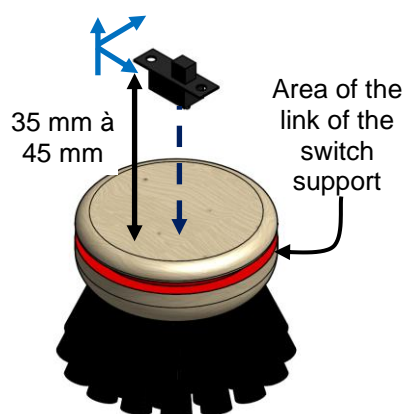
The battery box support is totally linked (without adjustments) with the brush.
The battery box support is adjustable with the battery box.

Adjustable range of the battery box: 10mm mini

The battery box support is fixed on the upper side of the brush thanks to 2 provided wood screws. These screws are not used for adjustments.

The battery box support is fixed on the battery box thanks to 2 provided bolts (M2 or M3).
These bolts are used for adjustments.
Pressure screws are forbidden.

LINK N°3 between the switch and the brush thanks to the “SWITCH SUPPORT”



The switch support is totally linked (without adjustments) with the brush and the switch.
The logo of the team is engraved on the switch support.
The engraved area allows an easy grip of the brush

Position of the switch:

- Vertically: distance between the upper side of the switch and the upper side of the brush: 35mm to 45mm
- Horizontally: the switch must be centred on the brush

The switch support is fixed on the cylindric groove of the brush thanks to 2 provided wood screws. These screws are not used for adjustments.

The switch is fixed on the switch support thanks to 2 provided bolts (M2 or M3).

The provided kit will be weighed at the beginning of the project and before the race to know the mass of the designed parts.

III – PROGRESS OF THE PROJECT:

STEP	WORK TO DO	MATERIAL USED	COMMENTS	MEMBERS OF THE TEAM INVOLVED
<u>(1)</u>	Kit weighing before design	Provided kit Scale	/	All
<u>2</u> <u>3 sessions</u>	Looking for solutions to make the chosen link.	Sheet (3d et 2d)	Simplicity of the solutions	Separately
<u>Project review about the preliminary design process: 10 to 15 minutes / group</u>				
<u>3</u> <u>7 sessions</u>	Design of the chosen solution. Drawing of each part and of the assembly on the brush.	SOLIDWORKS	19/11 is the last session	Separately
<u>4</u> <u>1 session</u>	After a discussion within the group, virtual verification on a brush of the possibility of assembly of all the components.	SOLIDWORKS	26/11	Separately
	If there are problems, the solve them.			Separately if necessary
<u>5</u> <u>1 session</u>	Exploded view of the chosen solution	SOLIDWORKS	03/12	Separately
<u>6</u> <u>2 sessions</u>	Plan layout of the chosen solution: <ul style="list-style-type: none"> •Designed parts with their functional dimensioning •The assembly with its parts list •The exploded view with the parts references and the parts list 	SOLIDWORKS	17/12	Separately
<u>January: Project review about the design process: 10 to 15 minutes / group</u>				
<u>7</u>	Making of the prototype	3D Printer	/	Separately
<u>8</u> <u>2h</u>	Assembly of the brush	Tools	/	All
<u>9</u>	Weighing of the modified brush	Finished brush Scale	/	All
<u>10</u> <u>1h</u>	Settings optimization to get the best performance possible.	Finished brush	/	All
<u>Project review about prototyping, assembly and tests: 10 to 15 minutes / group</u>				
<u>11</u> <u>1h</u>	Race with timing of each brush	Finished brush Circuit	/	All
<u>12</u>	Making a slideshow presenting the progress of the project, the choices made and the final results.	POWERPOINT	/	Separately
<u>13</u>	Making a paper file detailing the personal work during the project, the choices made and the final results.	WORD	/	Separately